

CLAIMS

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ART 31 AND 32

1. An R-T-B based sintered magnet having a composition comprising:

27.0 mass% to 32.0 mass% of R, which is at least one of

5 Nd, Pr, Dy and Tb and which always includes either Nd or Pr;

63.0 mass% to 72.5 mass% of T, which always includes Fe and up to 50% of which is replaceable with Co;

0.01 mass% to 0.08 mass% of Ga; and

0.85 mass% to 0.98 mass% of B.

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2. The R-T-B based sintered magnet of claim 1, further comprising at most 2.0 mass% of M, which is at least one element selected from the group consisting of Al, Si, Ti, V, Cr, Mn, Ni, Cu, Zn, Zr, Nb, Mo, In, Sn, Hf, Ta and W.

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3. The R-T-B based sintered magnet of claim 1 or 2, comprising a main phase with a tetragonal  $R_2T_{14}B$  type crystal structure, which accounts for at least 90% of the overall volume of the magnet, and including substantially no  $R_{1.1}Fe_4B_4$

20 phases.

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4. The R-T-B based sintered magnet of claim 1 or 2, having an oxygen concentration of at most 0.5 mass%, a nitrogen concentration of at most 0.2 mass%, and a hydrogen concentration of at most 0.01 mass%.

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5. A method for producing an R-T-B based sintered magnet, the method comprising the steps of:

preparing a powder of an alloy that has a composition comprising 27.0 mass% to 32.0 mass% of R (which is at least one of Nd, Pr, Dy and Tb and which always includes either Nd or Pr), 63.0 mass% to 72.5 mass% of T (which always includes Fe and up to 50% of which is replaceable with Co), 0.01 mass% to 0.08 mass% of Ga and 0.85 mass% to 0.98 mass% of B;

compacting and sintering the alloy powder, thereby making a sintered magnet; and

subjecting the sintered magnet to a heat treatment at a temperature of 400 °C to 600 °C.

6. The method of claim 5, wherein the step of preparing the alloy powder includes the steps of:

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preparing a melt of the alloy;

rapidly cooling and solidifying the melt of the alloy by  
a strip casting process, thereby making a rapidly solidified  
alloy; and

5 pulverizing the rapidly solidified alloy.